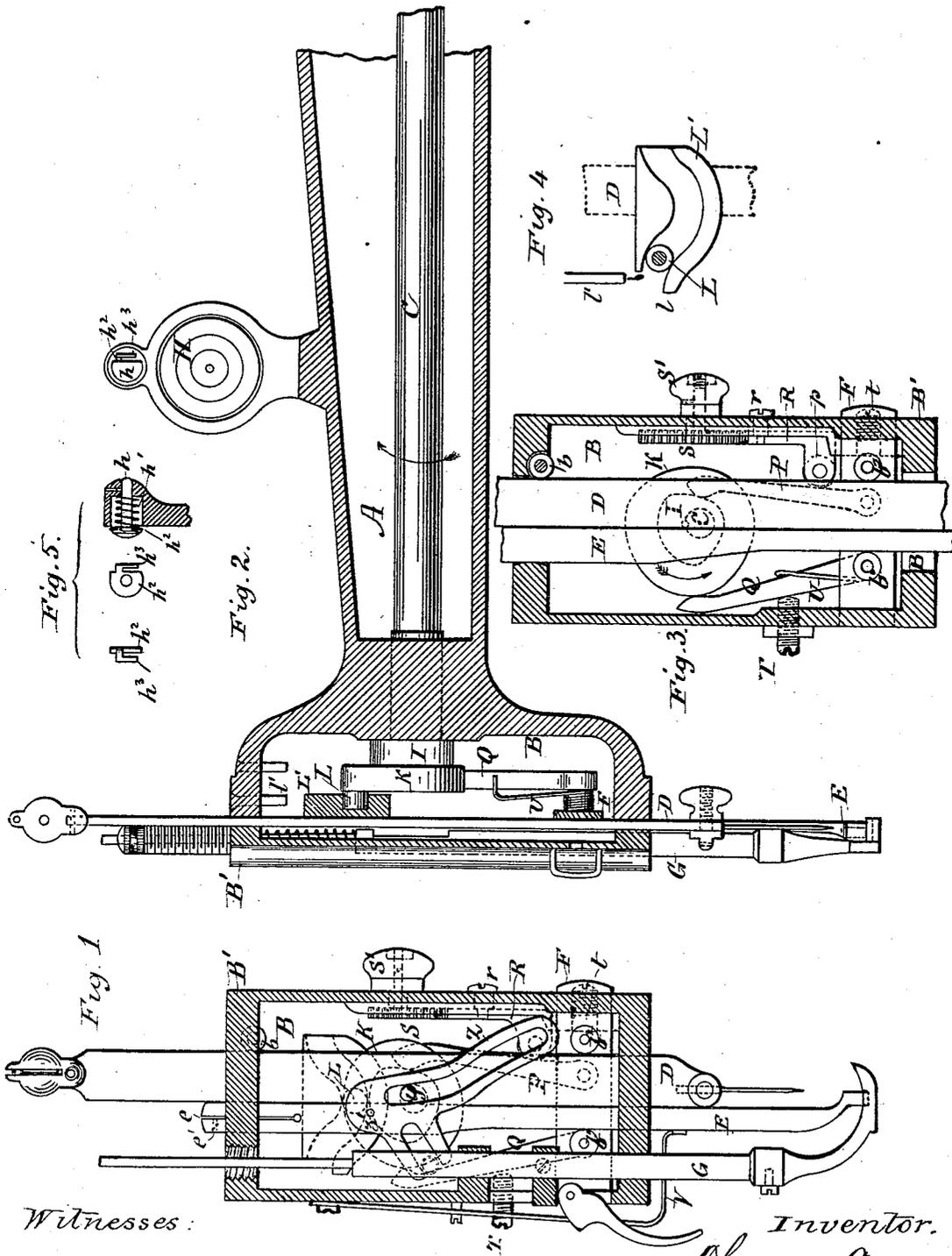


(Model.)

T. CAREY.
SEWING MACHINE.

No. 250,053.

Patented Nov. 29, 1881.



Witnesses:
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UNITED STATES PATENT OFFICE.

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SEWING-MACHINE.

SPECIFICATION forming part of Letters Patent No. 250,053, dated November 29, 1881.

Application filed May 28, 1881. (Model.)

To all whom it may concern:

Be it known that I, THOMAS CAREY, of Watertown, in the county of Jefferson and State of New York, have invented a new and useful Improvement in Sewing-Machines, which improvement is fully set forth in the following specification.

This invention relates more particularly to vertical-feed sewing-machines in which the feed is effected by the lateral movement of the needle-bar while the needle is below the cloth-plate, by the movement of a vertical feed bar, or by the conjoint action of the needle-bar and a vertical feed or helper bar, although portions thereof are applicable to other sewing-machines. It is intended as an improvement upon and is shown as embodied in the well-known Davis sewing-machine, in which the feed is effected by the conjoint action of the needle and vertical feed or helper bars. It has for its object to secure in working greater efficiency, ease, and freedom from noise, and to simplify the machine and render it more durable. As heretofore constructed the needle-bar has been reciprocated in a vertical direction through the intermediary of a cam-bar, upon the face of which the needle-bar was pivoted, and the lateral motion required for feeding has been given to it and to the vertical feed bar through a bar pivoted to the head of the machine at the top and forming the guide for the front edge of the needle-bar.

In the present invention the cam-bar is dispensed with and the needle-cam is carried by the needle-bar itself, and the lateral motion for feeding is obtained through a horizontal feed-bar which slides in guides in the head of the machine, the needle and vertical feed-bars working in guides in the upper part of the head and in the cross feed bar. By this improvement a number of parts are dispensed with and the friction and wear are much reduced.

Heretofore the vertical feeding devices—that is, the vertical feed bar and needle-bar—have been operated positively in one direction only, the return movement being effected solely by spring pressure, and the needle-bar during its descent has also been held in place by such pressure. In the present invention the opera-

tion of the needle-bar and vertical feed or helper bar by positive movement in both directions is insured, and the needle-bar is held firmly in position during its descent.

Heretofore the lengthening and shortening of the stitch has been effected by adjusting the upper end of the advancing feed-dog toward and away from its feed-cam. In the present invention the fulcrum of the advancing feed-dog is adjusted lengthwise of said dog. Means are provided to take up the wear between the feed-dogs and the cams, although this is not great. In the present invention, also, the friction of the vertical feeding devices in their guides is lessened by the introduction of rollers; the upper end of the helper-bar is split and provided with a screw for spreading to make it fit the guides and to compensate for wear; the oiling of the needle-cam is facilitated by the use, in connection with an oiling-tube, of a projecting ledge, which extends from the cam under the oiling-tube and conveys the oil into the cam-groove, and a more compact and simple check-tension than heretofore is employed. This check-tension is arranged between the tension and the spool-pin, and has for its object to prevent the jerks of the take-up on the thread from being communicated past the tension to the spool, so as to unwind a too great length of thread.

The following description will enable those skilled in the art to which the invention relates to make and use the same, reference being had to the accompanying drawings, which form a part of this specification and illustrate what is deemed the best mode of carrying the invention into effect.

Figure 1 is a face view, in sectional elevation, of the head of a Davis sewing-machine constructed in accordance with this invention; Fig. 2, a side view, in sectional elevation, through the head and outer part of the stationary arm or goose-neck, simplified by the omission of certain elements; and Fig. 3, a face view, showing the feed mechanism. Fig. 4 is a detail view, showing the needle-cam and oiling-tube; and Fig. 5, a detail view, showing the construction of the improved check-tension.

A is the stationary arm or goose-neck; B, the

head of the machine; B', the face-plate of the head; C, the main shaft; D, the needle-bar; E, the helper or vertical feed-bar; F, the horizontal feed-bar; G, the presser-bar, and H the tension.

The needle-bar, helper or vertical feed bar, and horizontal feed-bar are held between the head B and the face-plate B', the two former fitting in recesses in the face-plate, and the latter in recesses in the head. The needle-bar and vertical feed bar have substantially the same thickness, and are placed edge to edge. Their upper ends are held between the roller *b* fastened to the face-plate and the opposite wall of the recess, which is curved, so as to permit the bars to have a lateral or swinging motion in the direction of their width, as well as a reciprocating motion in the direction of their length. The lower ends are held between the rollers *b'* *b''* on the horizontal feed-bar and play in the recess at the bottom of the face-plate.

On the main shaft C are fixed, at the outer end, two irregular-shaped feed-cams, I K, and to the outer cam is fixed a pin, L, for imparting a vertical reciprocation to the needle-bar. This pin works in the irregular groove of a cam, L', riveted or otherwise fastened to the needle-bar. The groove in the needle-cam L' is substantially of the shape heretofore employed in the Davis and other shuttle machines.

The rise and fall of the helper or vertical feed bar is effected from a pin on the face of the needle-bar in the usual way through a bent lever, Z, which is pivoted at *z* to the vertical feed bar, is jointed at the extremity of one arm by a slot-and-pin connection to the presser-bar, and is provided with a slot in the other arm, the pin *y* on the needle-bar working in said slot. Lateral movement is imparted to the needle-bar and vertical feed bar from the feed-cams I K through the feed-dogs P Q, the springs U V, and the horizontal feed bar.

The feed-dogs P Q are pivoted on studs projecting from the rear side of the horizontal feed bar, and are so disposed that their upper ends are opposite, respectively, to the cams I K. The feed-dogs both form levers of the first order. The dog P, which advances the horizontal feed bar, and with it the vertical feed bar and needle-bar, has for its fulcrum the roller *p*, which is carried by the slide R. This slide moves in ways formed inside of the head B, being kept therein by the screw *r*, which extends through a slot in the head. It is adjustable by means of a rack and pinion, S, so as to raise and lower the roller *p*, and consequently to lengthen or shorten the stroke of the lower end of the feed-dog, and consequently of the vertical feed and needle bars. A knob, S', fixed to the shaft of the pinion outside the head is used to revolve said pinion and effect the adjustment.

The return feed dog Q has its fulcrum on the end of the screw T, which can be advanced so as to take up any wear between the feed-cams and dogs.

The springs U V are mainly used to avoid

the rattling that might otherwise occur, but they also aid in returning the horizontal feed bar. The spring U is coiled on the stud by which the dog Q is fastened to the horizontal feed bar, and the free end bears against said dog so as to hold it in contact with the screw T. The spring V is fastened to the head of the machine, and at its lower end bears against the vertical feed-bar E. Both springs tend to force the horizontal feed bar to the right, Figs. 1 and 3, and consequently to hold the upper end of the advancing feed-dog P in contact with the cam I. A stop on the bar F limits its movement in this direction by contact with a screw, *t*, which fits in a threaded hole in the head of the machine.

The upper end of the vertical feed bar is split, as shown at *e*, and a screw, *e'*, is combined with it, so as to spread the end, and thus adjust it to the recess in which it and the needle-bar are placed.

The needle-cam L' is provided on one side with a ledge, or projection, *l*, and immediately above the ledge is an oiling-tube, *l'*, depending from the top of the head B, so that the oil is sure to be conveyed to the groove in said cam.

On the stand of the tension H, which is constructed in any ordinary or suitable way, is a check-tension composed of a headed pin, *h*, having the head cut away on one side, a spring, *h'*, surrounding said pin, and fitted in a recess in the tension-stand, and a washer, *h''*, interposed between the said spring and the head of pin *h*. This washer is slotted and bent, as shown in Fig. 5, so as to have a tongue, *h'''*. The thread from the spool is passed behind this tongue over the pin *h*, between the head thereof and the washer *h''*, and thence to the tension H, the take-up, and the eye of the needle.

No attempt will be made to describe herein the take-up, since it forms no part of the present invention, and is or may be formed by the needle-bar and a co-operating device operated by a pin on the needle-bar in the same manner as in the Davis sewing-machine in common use.

The operation of the improved machine will readily be understood. As the needle-bar descends it carries with it the helper or vertical feed bar until the latter comes into contact with the goods on the cloth-plate when the presser-foot is lifted. During the descent the horizontal feed bar is held stationary by the dog Q, which at that time has its upper end in contact with cam K. As the dog Q is released the cam I acts upon the upper end of the dog P, forcing forward the lower end thereof, and with it the horizontal feed bar and the vertical feed and needle bars. By this movement the springs U V are retracted and the upper end of dog Q is moved toward the main shaft. The distance which the vertical feed and needle bars are advanced depends, of course, upon the position of the roller *p*. The advancement is completed after the needle-bar has commenced to rise, but before it has left the cloth-plate. The presser-bar is then allowed to de-

scend, the vertical feed bar rises, and with the needle-bar is returned to its first position ready for another stitch.

The return movement is effected by the joint action of the springs U V and the dog Q, or by the springs only, if of sufficient strength; but, in any case, the dog Q insures the return of the parts and holds them rigidly in position during the descent of the needle-bar.

The operation of the check-tension and the manner of oiling the needle have been already sufficiently described.

It is obvious that modifications may be made in the construction of the machine without departing from the spirit of this invention, and that parts of the invention can be used without the others. For example, the springs U V could be dispensed with, or the dog Q could be omitted; but in the former case the parts would be liable to rattle, and in the latter the positive return of the feed and needle bars would not be insured, nor would the horizontal feed bar be held firmly in position during the descent of the needle bar.

Other devices could be combined with the horizontal feed bar to operate the same. The needle-bar could be made to reciprocate in fixed bearings in the head of the machine, and cams and other devices be so arranged as to advance the feed-bars while the needle is out of the cloth. The advantages attending the needle-feed would, of course, be lost.

The horizontal feed bar and dogs and cams could be used to impart lateral movement to the needle-bar pivoted on the face of a cam-bar, and used alone or in combination with a helper or vertical feed bar.

Where the words "vertical feeding devices" are used in this specification they are intended to include one or more such devices, as a needle-bar capable of lateral movement to effect the feeding and a vertical feed bar, as well when used separately as when combined so as to co-operate with each other in feeding.

Having now fully described my said invention, and the manner in which the same is or may be carried into effect, what I claim is—

1. In a vertical feed sewing-machine, the combination of vertical feeding devices supported at the top in fixed guides, a horizontal feed bar connected with said devices below, a shaft turning in bearings in the goose-neck, and mechanism for imparting from said shaft vertical motion to said feeding devices and horizontal motion to said feed bar, and through it lateral movement to the vertical feeding devices aforesaid, substantially as described.

2. The combination of the horizontal feed bar with vertical feeding devices, supported at the upper ends in fixed guides and at the lower ends held between rollers carried by the horizontal feed bar, so that the latter imparts its full movement to the said feeding devices, substantially as described.

3. The combination, with the horizontal feed

bar, of the feed dogs and cams, substantially as described.

4. The combination of the main shaft, turning in bearings in the goose-neck, feed-cams fixed thereon, vertical feeding devices, and mechanism operated by said cams for advancing said devices positively and for insuring the return movement, also, by positive action, substantially as described.

5. The combination of vertical feeding devices, the horizontal feed bar, the feed-dogs and feed-cams, substantially as described.

6. The combination, with a feed-bar located in the head of a vertical feed sewing-machine, of the advancing feed dog, its cam, and the movable fulcrum adjustable lengthwise of said dog, substantially as described.

7. The combination of the horizontal feed bar, the return feed dog, its cam, and the adjustable fulcrum for said dog, substantially as described.

8. The combination of the horizontal feed bar, return feed dog, its fulcrum, and the spring arranged to hold it in contact with the fulcrum, substantially as described.

9. The combination of the horizontal feed bar, the feed-dogs, fulcrums for the dogs, feed-cams, and spring arranged to hold the advancing feed dog in contact with its fulcrum and cam and the return feed dog in contact with its fulcrum, substantially as described.

10. The needle-cam provided with a projecting ledge, in combination with an oiling-tube, arranged substantially as described.

11. The check-tension composed of the headed pin, spring, and bent washer, provided with a slot and tongue, substantially as described.

12. The combination, with a feed-bar supported in the head of a sewing-machine, of a feed-cam, a feed-dog, a slide carrying the fulcrum for said dog, and a rack and pinion for adjusting the position of the fulcrum, substantially as described.

13. The combination of the needle-bar and vertical feed or helper bar, both capable of movement laterally, and also in the direction of their length, the needle-cam fixed to the needle-bar, the presser-bar, and devices for imparting motion to the vertical feed and presser bars from said needle-bar, substantially as described.

14. The combination of the needle-bar and vertical feed or helper bar, means for raising the same, the horizontal feed bar, the feed-dogs, the fulcrums for said dogs, means for adjusting the fulcrum of the advancing feed dog lengthwise of said dog, the springs, and the feed-cams, substantially as described.

In testimony whereof I have signed this specification in the presence of two subscribing witnesses.

THOMAS CAREY.

Witnesses:

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